



USDA Forest Service Southern Research Station Project Fact Sheet

EFFECTS OF PRESCRIBED FIRE AND THINNING ON FUELS, EROSION, SUSTAINABLE PRODUCTIVITY, AND VEGETATION

A Case Study on the Enoree Ranger District, SC Piedmont

BENEFITS

- Stimulates growth of native vegetation
- Enhances nutrient cycling
- Improves wildlife habitat
- Controls plant diseases
- Reduces incidence and intensity of wildfire by reducing fuel load
- Improves species competition and wood quality
- Reduces hazard of high intensity crown fire

APPLICATIONS

Research and demonstration will provide technical and operational guidance for land management decisions within the National Forest and for private land owners.



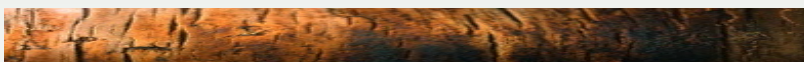
Forest Land Management Study will Ensure Long-Term Forest Stability and Productivity on Fragile Piedmont Ecosystems

Poor conservation practices following European settlement, due to agriculture, grazing, urbanization, and uncontrolled wildfire, dramatically reduced forested areas in the southeastern US. Such practices also exposed soils, increasing their susceptibility to erosion and decreasing soil fertility in the South Carolina Piedmont. In the 1930s, the Sumter National Forest's (SNF) Enoree District sought to regenerate forests and stabilize lands damaged with deep gully patterns and low productivity. Although forest restoration since that time is considered successful, land management practices have been limited given the concerns that any disturbance regime may result in reversion to previous erosion and nutrient loss conditions. As a result, the forests are dense, carry relatively high fuel loads, and have an unbalanced vegetative community composition. Two silvicultural options to reduce these hazards are prescribed burning and thinning.

In 2001, Enoree District officials funded an administrative study to explore these options for a particularly eroded forest compartment. The work was conducted in partnership with the Southern Research Station (SRS-4103, Charleston, SC) and the College of Charleston. Results indicate that treatment implementation will not degrade site quality and longer-term monitoring is ongoing.



Figure 1. Present day gully conditions on the Enoree District.



PROJECT DESCRIPTION

Objectives: To develop a comprehensive understanding of the effects of fire and thinning on forest fuels, soil stability and productivity, and vegetative succession for a historically disturbed Piedmont forest.

This study addressed the effects of burning, thinning, and combination thereof on ecosystem stability and productivity in an eroded Piedmont forest located an hour northwest of Columbia, SC. Fuel loading, mineral soil erosion, nutrient partitioning in the organic and soil layers, and vegetation were measured on 24 plots (n=24; 6 per treatment) both before and after thinning and/or prescribed fire.

Fuel load was measured using standard woody debris transects and forest floor cutouts to determine mass changes. Results indicated that the fire consumed 15-25% of the forest floor mass, exposed 10% mineral soil while thinning reduced woody debris by 2-4 tons/acre. Sediment fences determined that erosion before and after treatment was considered a trace amount (~0.0001-0.01 tons/acre/year), although consistent (but not statistically significant) erosion increases following fire and decreases following thin were observed. A soil erosion model tool, Water Erosion Prediction Project (WEPP), slightly overestimated erosion for this ecosystem, but was consistent with the general trends measured in this study.

Mineral soil and forest floor measurements indicated there were no treatment effects on the nutrient and carbon constituents of the forest floor and upper 12 cm of mineral soil. Finally, vegetative response indicated that thinning increased understory and herbaceous richness and burning had minimal effect. Potential caveats to the long-term interpretations include climatic conditions, burning conditions or repetition, and thinning procedures.

PROGRESS & MILESTONES

- Researchers initiated a baseline study in June 2001.
- a low intensity, dormant season burn occurred March 2002.
- An intermediate cut thinning (from 140 to 60 ft²/acre) occurred February 2002.
- Sampling conducted from July 2001 through July 2003 produced a management report and presentation of initial results.
- Long-term monitoring is on-going.
- A manuscript and General Technical Report (GTR) are forthcoming.
- A higher intensity burn is planned for winter 2005.

COLLABORATORS

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